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Evaluation of Two Grasses for Silvopasture Systems in the Great Plains

Michael E.L. Perry, Tala Awada, Walter Schacht, and Sue Ellen Pegg
Department of Agronomy and Horticulture and School of Natural Resources, UNL

Silvopasture, the practice of combining forestry, forage, and livestock production, is a type of agroforestry designed to provide economic returns to landowners while creating a sustainable land use system with environmental benefits. By integrating these three production systems into one intensively managed area, property owners can gain short-term economic returns from hay production and livestock grazing while long-term revenue is supplied from timber production. Grazing controls understory vegetation that can potentially compete with trees for moisture and nutrients, and trees in return provide a shaded environment that is favorable for many forage species.

In the Great Plains, silvopasture is an option in environments not suitable for traditional row crop production; however, a crucial element of system establishment is plant species selection. Considerations when evaluating potential tree species should include marketability, adaptability to semi-arid conditions, traits for rapid growth, and rooting depth. Grasses used should be able to tolerate shady conditions, grazing, and intensive management as well as be suitable for the chosen site. Forage quality and palatability are also a concern.

Studies conducted at the University of Nebraska Agricultural Research and Development Center near Mead, Nebraska

examined the forage component of a silvopasture system. Forage production and quality of two grasses, big bluestem (*Andropogon gerardii* Vitman.) and smooth brome grass (*Bromus inermis* Leyss), were determined at varying canopy densities of mature green ash (*Fraxinus pennsylvanica* Marsh) and Scotch pine (*Pinus sylvestris* L.) trees. Big bluestem is a native, perennial, warm-season grass that is highly adapted to the

summer growing conditions of Nebraska. It is a high quality forage for much of the summer when managed appropriately and is one of the most shade tolerant of the tall grasses found in the Great Plains. Smooth brome grass is a

cool-season, perennial species that is palatable and has high nutritive value in the spring and early summer. It is adapted to various soil types and environments with peak growth rates in May and June.

Seeded plots of the two grasses were established in open areas as well as under low, medium and high canopy cover of the two tree species. Big bluestem and smooth brome grass were seeded under this range of tree densities in mid-April 2000, allowed to establish throughout the growing season, and mowed in October 2000 to remove above-ground growth. Field sampling began in the spring of 2001 with measurements

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Forage production under high ash (*Fraxinus pennsylvanica*) canopy density.



Forage production under low ash (*Fraxinus pennsylvanica*) canopy density.

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The Center for Grassland Studies is a unit within the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources. It receives guidance from a Policy Advisory Committee and a 50-member Citizens Advisory Council. This newsletter is published quarterly.

Note: Opinions expressed in this newsletter are those of the authors and do not necessarily represent the policy of the Center for Grassland Studies, the Institute of Agriculture and Natural Resources or the University of Nebraska.

Martin A. MassengaleCGS Director
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Anne Moore Newsletter Layout



FROM THE DIRECTOR

Congress is currently in the process of rewriting or developing a new farm bill to replace the current one which expires in 2007. At this stage, no one knows exactly what will be in the new bill, but one thing is rather certain – there will be changes.

The prevailing thought is there will be reductions in commodity support programs. Most of this support goes to five crops: corn, wheat, rice, cotton, and soybeans. Forage, pasture, range, turfgrass, specialty crops and livestock have not received support of this kind. The primary public support these latter programs have received is through publicly funded research. There is a chance in the new farm bill that even publicly supported research could be reduced with the constraints imposed on the budget.

Research has been the engine that has had a significant role in keeping our agricultural productivity high and competitive on a worldwide basis. Agricultural commodities are still one of our bright spots in the export/import balance of trade. If we hope to keep our agriculture enterprise competitive on the world stage, then we must make significant investments in research and education. Data clearly show that investments made in agricultural research, education and extension over time have had very high returns.

Public dollars invested in agricultural research in recent years have lagged that of many other subject matter areas. It is now time for a significant infusion of new dollars into agricultural research and education for many reasons. The only way that this is likely to happen is by the commodity groups coming together to form a united front in supporting research. It appears that most increases in agriculture research monies have come about in recent times largely as the result of crises of one kind or another. A case in point is the energy crisis. There is a modest amount of money being included in the Department of Agriculture's 2007 budget for bioenergy research. That is an important start, but we need a much larger and sustained effort to become significantly more self-sufficient as a country in energy. Other important examples could be cited.

Research often takes many years for significant progress to be made. Now is the time to be investing resources in agriculture and many other important subject matter areas relating to agriculture. Much of our homeland security impinges on agriculturally related areas. Yet, little money is going into this area or even renewable energy, comparatively speaking. Now is the time to present a united front and ask for more resources to invest in these important efforts. I urge all of our readers, colleagues, friends and associates to accept the challenge.

M. A. Massengale

Research for the Birds: Sandhills Is the Target of Grassland Bird and Grazing Investigation

by Larkin Powell, School of Natural Resources, UNL

Nebraska's Sandhills contain the largest area of mixed-grass prairie remaining south of Canada. Our vast grassland resource supports cattle ranching – important both to the Sandhills ecosystem and Nebraska's economy, and provides unique habitat for grassland birds. Across the continent, the recent decline of some grassland birds had raised concern with biologists – especially in systems that have experienced vast habitat loss and fragmentation. The Sandhills, as a contiguous grassland, represents a unique opportunity to study bird populations.

Because grazing affects vegetation structure and diversity, cattle grazing can be viewed as a *de facto* management technique for wildlife in the region – literally millions of hectares are affected by grazing. However, not all grazing is the same; regimes range from season-long grazing in large pastures to short, intensive grazing in smaller grazing units. Biologists would like to encourage a grazing regime that results in productive, diverse wildlife communities.

Until recently, very few data from the Sandhills region were available to guide grazing management decisions with regard to wildlife. I worked with a team of other biologists at the University of Nebraska-Lincoln to investigate the relationship between grazing and grassland birds in the Sandhills. Silka (Finkbeiner) Kempema, a graduate research associate in the School of Natural Resources, and Walter Schacht, professor in the Department of Agronomy and Horticulture, collaborated on this study. Our study was supported by the Sandhills Task Force, a coalition of private ranchers and biologists with state and federal agencies. The Task Force provided contacts that led to 12 study sites on private ranches in the Sandhills. The interest and support from the Task Force is evidence that landowners in the Sandhills are concerned about wildlife populations; information on wildlife-grazing strategy interactions is indispensable for landowners as they make grazing management decisions.

Birds appear to respond differently to the various grazing systems currently in use in the Sandhills. Through preliminary observations, rotational grazing was thought to provide benefits to nesting birds because of the recovery intervals between grazing periods (e.g., 30 or more days) and higher plant diversity. Rotational grazing clips most vegetation during the grazing period, but recovery intervals may allow nesting birds to find adequate cover. Alternatively, season-long grazing provides a mix of grass lengths as cattle graze preferentially in certain spots, such as near water sources. A heavily-stocked, long-term grazed pasture could lose suitable nesting habitat early in the breeding season.

Our study's objectives were to: (1) determine the effect of vegetation structure and composition of grazed Sandhills pastures on grassland bird density, species richness, and nest



Western meadowlarks weave their covered nests into clumps of thick grass in the Sandhills. Researchers monitored their nest to assess productivity of grassland birds. (photo by Silka Kempema).

success, and (2) relate vegetation structure and composition to grazing regimes and facilitate management recommendations for ranchers in the Sandhills.

To be applicable to ranchers in the Sandhills, our research was conducted on private lands. Through the Sandhills Task Force, we contacted ranchers and received permission to work on their land. We selected 4 replicate ranches for each of the 3 grazing regimes [season-long continuous, management intensive grazing (≤ 14 days/unit), and 4-pasture deferred rotation (30-45 days/unit)], for a total of 12 ranches. We attempted to group ranches by geographic location and general habitat/elevation to ensure that the study was not confounded by ranch location, elevation, or general habitat type.

During the summers of 2002-2004, we conducted repeated bird surveys on each study site. We identified species of birds on transect surveys and estimated their density on our plots. Bird locations were documented with GPS and laser rangefinders. We also monitored bird nests on our study sites, and we measured vegetation structure and composition at the same time as the bird surveys. We measured vegetation structure with a Robel pole, a graduated device that uses vegetation height and density as an index to biomass.

We recorded a total of 32, 53 and 56 avian species in 2002, 2003 and 2004, respectively. Western meadowlarks and grasshopper sparrows comprised 60-70% of the total number of birds recorded. Bird species richness, a count of the number of species observed on each pasture, tended to be higher on

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Evaluation of Two Grasses for Silvopasture Systems in the Great Plains (continued from page 1)

including light quantity and quality, soil moisture levels, forage yield and quality, specific leaf area, and leaf photosynthesis, water and nitrogen use efficiencies and chlorophyll content.

Yields of big bluestem and smooth brome grass were estimated in the plots representing a full range of canopy covers during the peak forage production months of June and September. Light transmittance measurements (using light sensing equipment) were taken periodically in each plot through the growing season. The light measurements were then related to yield estimates in the full range of plots using regression analysis. Yields of the two grasses increased proportionally as light transmittance increased; however, the rate of yield increase slowed down for smooth brome grass at high levels of light transmittance. Specifically, big bluestem yields were greater than smooth brome grass yields under low canopy cover, whereas smooth brome grass exhibited slightly greater yields than big bluestem under dense shade. Peak yields of both species occurred at low canopy cover; big bluestem peak yield was in September at about 2.65 tons DM/ha, whereas peak yield for smooth brome grass was in June at 1.4 tons DM/ha. Big bluestem plants under low canopy densities were taller and in later developmental stages than plants in highly shaded plots. Similarly, smooth brome grass showed more reproductive tillers as light increased.

Forage quality was evaluated by calculating crude protein (CP) concentrations from nitrogen content analysis in grass leaves and stems. Results under both green ash and Scotch pine canopies indicated that CP content in big bluestem and smooth brome grass plant tissue decreased as light transmittance increased. These elevated concentrations are due to the early developmental stages and high leaf:stem ratios of plants growing in more heavily shaded plots. As light transmittance increased, a higher percentage of the grass tillers became reproductive, resulting in relatively low leaf:stem ratios and low nutrient density. Crude protein content of big bluestem was lower than smooth brome grass at all light levels; however, leaf CP content of both species was generally greater than 10%. Nitrogen use efficiency is an instantaneous measure of the N cost required to assimilate CO₂ at the tissue level, and is a useful indicator of plant performance in relation to soil fertility. Big bluestem is a nitrogen-efficient plant that would be expected to perform better than smooth brome grass in nitrogen-limiting systems.

Overall, as yields decreased with decreasing light levels, CP concentration increased. Knowing that this relationship exists, the landowner needs to decide on production goals and then manage for the optimum combination of forage yields and quality. Assuming the optimum dietary CP concentration of a grazing cow-calf pair is 10%, managing for high CP content

in the grasses would be counterproductive from a livestock production perspective. High CP concentrations in forages are not efficiently utilized by cows, and forage and livestock production per acre decreases with increasing canopy cover. Generally, CP content of big bluestem and smooth brome grass leaves was 10% or greater indicating that nearly the full range of canopy cover would provide optimum levels of nutrition for a grazing cow-calf pair. Knowing that CP content would be adequate in most situations, the landowner would need to select the tree density that would provide the optimum combination of wood production and forage production for the targeted livestock enterprise. The understory grasses used in this study have the potential of being included in a silvopasture system because of their productivity under a wide range of light levels and their good forage quality.

Although both species appeared to be well adapted to a wide range of light conditions, physiological measurements taken at the green ash site indicated that the two grasses use different mechanisms to acclimate to varying light levels. Big bluestem displayed a higher rate of photosynthesis as well as a greater photosynthetic decline with increased shade than smooth brome grass. Conversely, transpiration (i.e., plant water loss) in smooth brome grass was higher at all light levels than in big bluestem, and it decreased with increased canopy densities in both forage species. Photosynthetic rates combined with transpiration measurements determine a plant's efficiency in water use. Therefore, the high photosynthesis rates and low transpiration observed in big bluestem result in a higher water use efficiency, which may be beneficial in areas where water is less available.

Total chlorophyll content of smooth brome grass leaves increased in response to denser ash canopies, which was a trend not seen in big bluestem. This elevated chlorophyll concentration in smooth brome grass indicates an increased light-harvesting system and, consequently, a greater ability to acclimate to shade. Finally, in both forage species, specific leaf area increased as canopy density increased, although smooth brome grass leaf area did so at a greater rate, and this larger leaf area permits enhanced production by the total leaf.

In conclusion, both forage species had the levels of forage production and quality necessary for successful silvopasture systems. As a result, specific production goals, management guidelines, and environmental conditions should be considered by landowners when selecting between these forage species, and the silvopasture system should be managed for the optimum combination of forage yields and quality to meet those specifications.

Research for the Birds: Sandhills Is the Target of Grassland Bird and Grazing Investigation

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long-duration systems (50 species detected). During all years of the study, we noted that species counts tended to be higher on continuous, long-duration grazing systems and lower on medium (4-pasture) and short-duration (management intensive) systems. This trend was especially true during the years of drought stress (2002 and 2003).

We used our survey data to estimate density (birds/100 ha) for grassland bird species. As noted above, grasshopper sparrows and western meadowlarks were the most common birds on our surveys; these species had the highest densities (grasshopper sparrow: 93.6 birds/100 ha, western meadowlark: 37.9 birds/100 ha). We also found high densities of brown-headed cowbirds (21.0 birds/100ha), a nest parasite that lays its eggs in the nests of other birds, reducing the host's productivity. Other birds in our study included lark sparrow (18.2 birds/100 ha), mourning dove (5.9 birds/100 ha), field sparrow (1.9 birds/100 ha), and upland sandpiper (4.9 birds/100 ha). Our study did not find a clear effect of grazing system on density of any species.

Biologists use the probability of daily nest survival to assess risk of nest failure from predators. Daily nest survival is the probability that a nest will survive a 24-hour period. It is not uncommon for only 30-40% of bird nests to survive from egg laying to fledging of young – approximately 25 days for most songbird species. Snakes, small rodents, mid-size carnivores, avian predators, and even deer, cattle, and box turtles have been documented as nest predators in other studies on the Great Plains. Thus, biologists are very interested in factors that may increase or decrease the risk of predation of eggs or nestlings.

We used our nest monitoring data to test for potential effects of year, bird species, grazing system, cattle stocking rate, parasitism by brown-headed cowbirds, and vegetation structure. Daily nest survival did not vary by grazing system. Our analysis suggests that year and parasitism were the most important factors for predicting the outcome of a nest. Nests parasitized by brown-headed cowbirds suffered lower survival rates compared to unparasitized nests. Year may serve as a surrogate variable for drought conditions, as climate was very different during the three years of our study. In our sample of nests, lark sparrows and upland sandpipers had highest estimates of daily nest survival (about 93%), and mourning doves had the lowest daily nest survival (89%).

Our analysis of vegetation structure during the growing season indicated that long-duration pastures developed a more heterogeneous structure; that is, as the growing season progressed, areas within the pasture developed very different structures, as predicted. We believe this trend may be responsible for the increased diversity of birds on long-duration pastures. In contrast, short-duration pastures tended to become more homogeneous with time. So, short, intensive grazing periods resulted in patches within the pasture that had similar vegetation structure. We documented considerable variability in vegetation structure on the ranches we studied. This vari-



Field research technician, Josh Jordening, records vegetation cover data on a Sandhills study site using a Daubermire frame (photo by Silka Kempema).

ability is not unexpected, as site-specific factors (e.g., soil and slope) may facilitate response to annual weather variations. In addition, ranchers employed a wide range of options for stocking rates, cattle densities, and grazing duration within grazing system treatment.

Our study provides evidence that grazing affects vegetation structure in the Nebraska Sandhills, and that the structure of the vegetation can influence bird community composition. We suggest that biologists should not assess the merit of a grazing management strategy for wildlife based on the grazing system category alone. Grazing system was not a consistent predictor for grassland bird species richness, density, or productivity. Other parameters, such as stocking rate and cowbird nest parasitism, had a stronger effect on grassland bird productivity than grazing system.

Our results suggest that grassland birds in the Sandhills can be managed best by focusing on manipulations of grazing intensity, rather than on grazing system. Private ranchers will continue to make unique decisions, and our future research will target the impact of grazing timing and duration on vegetative structure and composition.

UNL Professional Golf Management Program Scores a First

While most students were either home visiting friends and family or hitting the ski slopes or beaches during spring break, 19 PGM students were taking tests administered by PGA professionals here on campus. On the first Saturday and Sunday of the break from classes, these students, who are in their second year of the PGA-accredited PGM program administered by the CGS, were either sitting in a classroom taking written tests over topics such as the PGA constitution, rules of golf, golf car fleet management, career enhancement, tournament operations, teaching the game and golfer development, or they were in a lab setting demonstrating their ability to use equipment to measure lie and loft or swing weight of a club. While students may continue to take their academic courses regardless of their performance at the checkpoints (to use the PGA terminology), they must pass all segments of each checkpoint (there are a total of three checkpoints) in order to proceed to the next level of the PGA/PGM™ program.

How did they do in this first checkpoint ever held in Lincoln? For the first time in any PGA/PGM™ program – at a university or at the PGA testing center in Florida – 100 percent of those who attempted a checkpoint passed.

“This is unprecedented,” said Terrance Riordan, director of the UNL PGM program. “We knew our students had the potential, but to accomplish this really shows how hard our students work.”

Normally, 20% to 50% of students fail at least one or more of the series of eight tests in Checkpoint 1 and must retake it at another time and place. In addition, “the PGA said that new programs should expect a 50% failure rate,” Riordan said. “The



PGM staff and students pose for a celebratory photo after 100% of the students who took Checkpoint 1 passed it. Back row, left: Scott Holly (PGM Coordinator), Joseph Hanko (visiting student from another PGM program), John Butler, Brandon McDermott, Brett Morgan, Greg Spence, Mike Stuntz, Chris Wise, Nick Muller, Brad Thorberg. Middle row: Terry Riordan (PGM Director), Jason Harrell, Josh White, Tyler Rolf, Todd Schafersman, Brad Cloke, Zach Wetovick, Tara Pawling (PGM Administrative Assistant). Front row: Mike Booth, Tyler Bolin, Eliot Mays, Nathan Kalin, Jared Kalin.

PGA staff was very impressed with the performance and the professionalism of our students,” he said.

Since all 19 students passed, they all attended the seminars presented by the PGA professionals on the third and fourth day. Only then did they start their spring break, for which they were more than ready!

Invasive Species Is Theme of Prairie Conference



The 20th North American Prairie Conference, to be held July 23-26, 2006 on the University of Nebraska at Kearney campus, will focus on invasive species as they affect the prairie ecosystem. This will include but is not limited to: plants such as Canada thistle, downy

brome or cheat grass, invasive cattails, leafy spurge, multiflora rose, purple loosestrife, common reed, saltcedar, sericea lespedeza; and animals such as European starling, house mouse, house sparrow, Norway rat, red imported fire ant, wild boar. Other topics for which abstracts were solicited include: Fire & Soil in Prairies, Landscape Ecology, Management of Prairies, Plant Physiology & Botany, Prairie Anthropology, Prairie Climatology and Drought, Prairie Exhibits, Literature & History, Prairie Restoration, Prairie Education, Prairie Entomology (& other Arthropods), Prairie Wetlands, Prairie Zoology (Herpetiles, Birds & Mammals). For program and registration information, see the conference Web site, NAPC2006.org.

Third National Conference on Grazing Lands



“Grazinglands, Gateway to Success” is the theme of the Third National Conference on Grazing Lands in St. Louis December 10-13, 2006.

The target audience for this conference includes: ranchers; farmers; federal, state and local land managers and policy

makers; range and pasture management specialists; researchers; educators; students; consultants; tribal representatives; consumers; seed, animal and other related companies; wildlife biologists; conservationists; and others interested in proper grazing land management and its benefits.

The conference will address such topics as grazing management strategies, economic impacts, new technologies, wildlife management, animal nutrition, environmental and ecological considerations, legislation, impact on urban areas, public lands/private lands interface, marketing sustainable grazing land strategies, grazing land health, partnerships, and public policy implications. See the conference Web site, www.glci.org/3NCGIndex.htm.

Program Set for 2006 Nebraska Grazing Conference

Back by popular demand, Barry Dunn with the King Ranch Institute in Texas and Fred Provenza at Utah State University will make return appearances at the Nebraska Grazing Conference in 2006. They will be joined by many new speakers on the program of the sixth annual conference to be held at the Kearney Holiday Inn on August 7 and 8. As you can see, it promises to be another great conference that offers top-notch speakers discussing hot topics!

Monday, August 7

Welcome, Sallie Atkins, Nebraska Beef Council and producer, Halsey, NE

Using Animal Behavior to Manage Grazing, Fred Provenza, Utah State University, Logan, UT

Highlights of the Grazing Livestock Systems Undergraduate Major, Walter Schacht, UNL, Lincoln, NE

Making Schads with Grazing Yearlings, Terry Klopfenstein, UNL, Lincoln, NE

Concurrent sessions:

Promoting Grassland Biodiversity: Mark Humpert, Nebraska Game and Parks Commission, Lincoln, NE (Nebraska Natural Legacy Project); Gerry Steinauer/Jarren Kuipers, Nebraska Game and Parks Commission, Aurora/Beatrice, NE (Landowner Incentive Program); Chris Helzer, The Nature Conservancy, Aurora, NE (importance of heterogeneity in grasslands and how to balance that with control of invasive species)

Irrigated Pastures: Jerry Volesky, UNL, North Platte, NE (grazing management of irrigated pastures); Bob Scriven, grazing consultant, Kearney, NE (mistakes producers should avoid); J.D. Anderson, producer, Arapahoe, NE

Holistic Grazing Planning – From the Grass Roots Up, Byron Shelton, Holistic Management International Certified Educator, Buena Vista, CO

Setting Up Grazing Systems, producer panel

Animal Behavioral Management Workshop, Fred Provenza

Tuesday, August 8

Conservation Easements: A Private Path to Permanent Protection, Dave Sands, The Nebraska Land Trust, Lincoln, NE

Measuring Success in Grazing Management: A Balanced Approach, Barry Dunn, King Ranch Institute for Ranch Management, Texas A&M University, Kingsville, TX

Concurrent sessions:

Birds and Grazing: Silka Kempema, UNL, Lincoln, NE (effect of grazing systems on grassland birds in the Sandhills); Jeff Drahot, U.S. Fish and Wildlife Service, Kearney, NE (wetland grazing: effects on wildlife and livestock); Dan Kim, Platte River Whooping Crane Maintenance Trust, Wood River, NE (effects of deferred grazing rotation use on grassland birds in central Platte River valley)

Winter and Summer Grazing Options: Larry Wagner and Julie Williams, DVM, Wagner Land and Livestock and Bijou Hills Grass-fed Meat, LLC, Chamberlain, SD (swath grazing); Rob Mitchell, USDA - Agricultural Research Service, Lincoln, NE (economics of big bluestem vs corn)

Breeding Grasses for Improved Beef Cattle Income Per Acre, Ken Vogel, USDA - Agricultural Research Service, Lincoln, NE

Integrating Pasture with Row Crop Production, John Sellers, Grassland Systems Program Coordinator for Leopold Center and producer, Corydon, IA

The two-day pre-registration fee of \$70 is due to the Center for Grassland Studies by August 1. The fee covers lunch both days, the evening meal, break refreshments, and materials (including proceedings). One-day registrations are also available. Late fees apply to registrations postmarked after August 1 and to walk-ins. **Checks are to be made out to 2006 Nebraska Grazing Conference** (sorry, credit cards are not accepted). Note the refund policy: cancellations received by August 1, 2006, will receive a copy of the proceedings and a refund of registration fee less \$10. Cancellations after August 1 will not receive a refund but will be sent a copy of the proceedings.

Participants of any of the previous Nebraska Grazing Conferences as well as all Nebraska extension educators will receive a brochure in the mail. Others may contact the CGS office to be put on the mailing list. Information and registration form are also on the CGS Web site (www.grassland.unl.edu).

The conference is a collaborative effort with many co-sponsors in the public and private sectors. The underwriting sponsors (\$1,000 each) of last year's conference were the Center for Grassland Studies, Nebraska Grazing Lands Coalition, and Nebraska Game and Parks Commission (this year's sponsorship list is not yet finalized).

Nebraska Range Shortcourse

Everyone is invited to register for the 15th offering of the Nebraska Range Shortcourse to be held on the campus of Chadron State College from June 18 to 23, 2006. The week-long course focuses on the principles of range ecology and management and the efficient use of rangeland resources for a variety of purposes. Each morning, three or four classroom sessions about one hour long will be presented by experts in each topic area. Afternoon field trips include plant identification, measurement techniques, rangeland assessment, and a ranch tour. Participants commonly include federal agency personnel (i.e., NRCS and USFS), university and college students, personnel of the Cooperative Extension Service and Natural Resources Districts, high school teachers, ranchers, and many others. The registration fee of \$195 includes all materials that will be used for the shortcourse (notebook and other reference material), transportation for field trips, and some instructor expenses. Registration deadline is May 15, 2006. For details, see agronomy.unl.edu/range-shortcourse, or contact the Center for Grassland Studies.

Info Tuft



According to the recently completed Tallgrass Prairie Project conducted by the Nebraska Wildlife Federation, current estimates are that just one to two percent of the 15 million acres of tallgrass prairie that once covered the eastern one-third of Nebraska remain. The project, which compiled information on more than 1,030 native tallgrass prairies in eastern Nebraska, also led to a method for locating likely prairies using satellite pictures and other digital information that could make the search for the remaining tallgrass prairies easier in the future.



Resources

How to Direct Market Your Beef. This new (2005) 96-page publication from the USDA Sustainable Agriculture Research and Education (SARE) program portrays how one couple used their family's ranch to launch a profitable, grass-based beef operation focused on direct market sales. From slaughtering to packaging, through labeling and advertising, Jan and Will Holder transform their real-life experiences to a compelling narrative rich with practical tips. Order hard copy or read online at www.sare.org/publications/beef.htm.

Nebraska Environmental Education Master Plan. Published in late 2005 by the Nebraska Alliance for Conservation and Environmental Education, this comprehensive plan is the culmination of four years of effort by more than 185 Nebraskans. NACEE, founded in 2001, is an organization devoted to promoting and strengthening environmental education efforts in Nebraska. Download the publication and/or learn more about the organization at www.nacee.org. For print copies, contact Marian Langan, Spring Creek Prairie Audubon Center, 402-797-2301, scp@audubon.org.

CGS Associates

At the Statehood Day Dinner on March 4, 2006, CGS Director **Martin Massengale** was honored with a Wagonmaster Award, which is presented to Nebraskans who have set an example for others to follow and distinguished themselves as leaders by their involvement in causes that benefit the state and nation. Others receiving awards that evening included former Nebraska governor and U.S. senator Bob Kerrey, U.S. Poet Laureate Ted Kooser, former state senator Lavon Crosby, journalist Keith Blackledge, and cattleman Jack Maddux.

On March 8 **Kim Todd** was presented with a Junior Faculty Holling Family Award for Teaching Excellence.

CGS Associates who were among the faculty and staff members honored in January by the UNL Teaching Council and UNL Parents Association with a "Certificate for Recognition for Contributions to Students" were **Chris Calkins, Tiffany Heng-Moss, Svata Louda, Larkin Powell, Bryan Reiling, James Stubbendieck** and **Kim Todd**.

Steve Baenziger, Roch Gaussoin, Ellen Paparozzi, Terry Riordan and **Bob Shearman** were among the faculty recognized at the first "The Power of Invention" dinner on March 31 that honored the inventions and inventors whose work helped enhance the quality of life in Nebraska. Many of their inventions have already been licensed to businesses in Nebraska and beyond.

Bryan Reiling was recognized by the Midwest Sections of the American Society of Animal Science and the American Dairy Science Association with the Outstanding Young Teacher Award.

At the College of Agricultural Sciences and Natural Resources Awards Banquet in April, **Terry Riordan** received the Superior Academic Advising Award.

Robert Wilson received the Outstanding Extension Award recently from the Weed Science Society of America at the annual WSSA conference in New York City.

Shashi Verma received the 2006 award for Outstanding Achievement in Biometeorology from the American Meteorological Society for "pioneering research that revolutionized the measurement of carbon dioxide, methane, water and energy exchange between plants and the atmosphere and for outstanding mentoring and leadership."

Calendar

Contact CGS for more information on these upcoming events:

2006

- June 18-23** Nebraska Range Shortcourse, Chadron, NE, agronomy.unl.edu/rangeshortcourse
- July 17-21** Nike Junior Golf Camp, Lincoln, NE, pgm.unl.edu
- July 23-26** 20th North American Prairie Conference, Kearney, NE, NAPC2006.org
- Aug. 7-8** 2006 Nebraska Grazing Conference, Kearney, NE, www.grassland.unl.edu/grazeconf.htm
- Nov. 12-16** ASA-CSSA-SSSA International Meetings, Indianapolis, IN, www.agronomy.org/meetings.html
- Dec. 10-13** 3rd National Conference on Grazing Lands, St Louis, MO, www.glci.org/3NCGLindex.htm

Nebraska UNIVERSITY OF
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